

CLAIMS

Having thus described the invention, what is claimed is:

1. A machine tool installation for laser cutting of sheet workpieces comprising:
 - (a) a workpiece support;
 - (b) an elongated machine frame providing an arm extending over said workpiece support;
 - (c) a track on said arm and extending longitudinally of said frame;
 - (d) a motion unit suspended from said track and mounted for movement therealong;
 - (e) drive means for moving said motion unit bidirectionally along said track;
 - (f) a laser cutting unit mounted on said motion unit and including a laser cutting head movable thereon in an axis perpendicular to said track;
 - (g) a loading unit at a loading station adjacent one end of said machine frame for lifting and transporting a sheet workpiece above the plane of the upper surface of said workpiece support; said loading assembly being moveable on said track;
 - (h) an unloading unit at a parts receiving station adjacent the other end of said machine frame for lifting the cut workpieces from said workpiece support and moveable on said track and transporting them to the parts receiving station;

(i) means on said motion unit for releasably coupling said loading unit and unloading unit thereto for movement therewith along said track on said machine frame; and

(j) a controller operable to (i) couple said loading and unloading units to said motion unit, (ii) control movement of said motion unit along said track, (iii) deposit a workpiece on said workpiece support, (iv) effect motion of said laser cutting head relative to a workpiece on said workpiece support to produce cut parts, (v) actuate said unloading unit to remove the cut parts from the workpiece support, and (vi) transport the parts on said unloading unit to the parts receiving station.

2. The machine tool installation in accordance with Claim 1 wherein a pair of parallel tracks are provided on said arm of said machine frame.

3. The machine tool installation in accordance with Claim 1 wherein said motion unit drive means comprises a rack on said arm of said machine frame, a pinion on said motion unit engaged with said rack, and a bidirectional motor for driving said pinion.

4. The machine tool installation in accordance with Claim 1 wherein frame extensions are provided on both ends of said machine frame, said frame extensions extending over said loading station and parts receiving station, said frame extensions having tracks thereon aligned with, and functioning as a continuation of, the tracks on said arm of said machine frame.

5. The machine tool installation in accordance with Claim 1 including a coupling device on each of said loading and unloading unit and extending longitudinally of said frame, said releasable coupling means being provided at the ends of said coupling devices and engageable with cooperating coupling means on said motion unit.

6. The machine tool installation in accordance with Claim 1 wherein said motion unit has a track on its lower surface extending perpendicularly to said track on said machine frame arm, and wherein said laser cutting unit is movably mounted on said motion unit track.

7. The machine tool installation in accordance with Claim 6 wherein said laser cutting unit is movable on said motion unit track by a rack and pinion drive assembly and a reversible drive motor.

8. The machine tool installation in accordance with Claim 1 wherein said motion unit supports a bellows providing an enclosed beam passage chamber which extends along said motion unit to said laser cutting unit.

9. The machine tool installation in accordance with Claim 6 wherein laser cutting of the workpiece in the longitudinal direction of the frame (X-axis) is effected by movement of said motion unit on said frame and cutting in the direction perpendicular thereto (Y-axis) is effected by movement of said laser cutting unit along said track on said motion unit.

10. The machine tool installation in accordance with Claim 9 wherein said laser cutting unit includes a drive for moving the laser cutting head in the vertical direction.

11. The machine tool installation in accordance with Claim 1 wherein said loading unit includes a multiplicity of suction devices actuatable to pick up and transport a sheet workpiece.

12. A machine tool installation for laser cutting of sheet workpieces comprising:

- (a) a workpiece support;
- (b) an elongated machine frame providing an arm extending over said workpiece support;
- (c) a pair of tracks on said arm and extending longitudinally of said frame;
- (d) a motion unit suspended from said track and mounted for movement therealong, said motion unit having a track on its lower surface;
- (e) drive means for moving said motion unit bidirectionally along said tracks, said motion unit drive means comprising a rack on said arm of said machine frame, a pinion on said motion unit engaged with said rack, and a bidirectional motor for driving said pinion;
- (f) a laser cutting unit mounted on said track on the lower surface and said motion unit and extending in an axis perpendicular to said track and including a laser cutting head movable thereon;

(g) a loading unit at a loading station adjacent one end of said machine frame for lifting and transporting a sheet workpiece above the plane of the upper surface of said workpiece support; said loading unit being moveable on said track;

(h) an unloading unit at a parts receiving station adjacent the other end of said machine frame for lifting the cut workpieces from said workpiece support and moveable on said track for transporting the cut workpieces to the parts receiving station;

(i) means on said motion unit for releasably coupling said loading unit and unloading unit thereto for movement therewith along said tracks on said frame; and

(j) a controller operable to (i) couple said loading and unloading units to said motion unit, (ii) control movement of said motion unit along said track, (iii) deposit a workpiece on said workpiece support, (iv) effect motion of said laser cutting head relative to a workpiece on said workpiece support to produce cut parts, (v) actuate said unloading unit to remove the cut parts from the workpiece support, and (vi) transport the parts on said unloading unit to the parts receiving station.

13. The machine tool installation in accordance with Claim 12 wherein frame extensions are provided on both ends of said machine frame, said frame extensions extending over said loading station and parts receiving station, said frame extensions having tracks thereon aligned with, and functioning as a continuation of, the tracks on said arm of said machine frame.

14. The machine tool installation in accordance with Claim 12 including a coupling device on each of said loading and unloading units and extending longitudinally of said frame, said releasable coupling means being provided at the ends of said coupling devices and engageable with cooperating coupling means on said motion unit.

15. The machine tool installation in accordance with Claim 12 wherein said laser cutting unit is movable on said motion unit track by a rack and pinion drive assembly and a reversible drive motor.

16. The machine tool installation in accordance with Claim 12 wherein laser cutting of the workpiece in the longitudinal direction of the frame (X-axis) is effected by movement of said motion unit on said frame and cutting in the direction perpendicular thereto (Y-axis) is effected by movement of said laser cutting unit along said track on said motion unit.